

Claims

- [c1] 1. A method for operating a vehicle having a variable displacement engine, a motor, and an electrical storage device operatively connected to the motor, the method comprising:
 - determining a demanded torque for the vehicle;
 - comparing the demanded torque to a first torque threshold;
 - partitioning the demanded torque into an engine torque and a motor torque based on the comparison of the demanded torque to the first torque threshold;
 - comparing the demanded torque to a second torque threshold when the engine torque is non-zero; and
 - determining a number of operating cylinders for the engine when the engine torque is non-zero, the number of operating cylinders being based on the comparison of the demanded torque to the second torque threshold.
- [c2] 2. The method of claim 1, wherein partitioning the demanded torque includes allocating all of the demanded torque to the motor when the demanded torque is not above the first torque threshold.
- [c3] 3. The method of claim 1, wherein partitioning the de-

manded torque includes allocating at least some of the demanded torque to the engine when the demanded torque is above the first torque threshold.

- [c4] 4. The method of claim 1, wherein all of the engine cylinders are operated when the demanded torque is above the second torque threshold.
- [c5] 5. The method of claim 1, further comprising allocating all of the demanded torque to the engine when the electrical storage device has a state of charge below a pre-determined level.
- [c6] 6. The method of claim 1, wherein the first torque threshold is a function of vehicle speed or engine speed.
- [c7] 7. The method of claim 1, further comprising allocating a majority of torque values to the motor when the demanded torque changes rapidly, thereby maintaining a substantially constant engine torque allocation.
- [c8] 8. A method for operating a vehicle having a variable displacement engine, a motor, and an electrical storage device operatively connected to the motor, the method comprising:
determining a demanded torque for the vehicle;
comparing an amount of charge in the electrical storage device to a predetermined value, the predetermined

value being based on the demanded torque; comparing the demanded torque to a first torque threshold when the amount of charge is above the pre-determined value; partitioning the demanded torque into an engine torque and a motor torque based on the comparison of the demanded torque to the first torque threshold; comparing the demanded torque to a second torque threshold when the amount of charge is not above the predetermined value; and determining a number of operating cylinders for the engine based on the comparison of the demanded torque to the second torque threshold.

- [c9] 9. The method of claim 8, wherein partitioning the demanded torque includes allocating all of the demanded torque to the motor when the demanded torque is not above the first torque threshold.
- [c10] 10. The method of claim 8, wherein all of the engine cylinders are operated when the demanded torque is above the second torque threshold.
- [c11] 11. The method of claim 8, further comprising comparing the demanded torque to the second torque threshold when the amount of charge is above the predetermined value and the demanded torque is above the first torque

threshold.

- [c12] 12. The method of claim 8, further comprising allocating all of the demanded torque to the engine when the amount of charge of the electrical storage device is not above the predetermined value.
- [c13] 13. A method for operating a vehicle having a variable displacement engine, a motor, and an electrical storage device operatively connected to the motor, the method comprising:
 - determining a demanded torque for the vehicle;
 - comparing an amount of charge in the electrical storage device to a predetermined value, the predetermined value being based on the demanded torque;
 - allocating all of the torque to the engine when the amount of charge of the electrical storage device is not above the predetermined value;
 - comparing the demanded torque to a torque threshold;
 - determining a number of operating cylinders for the engine based on the comparison of the demanded torque to the torque threshold.
- [c14] 14. The method of claim 13, wherein all of the cylinders are operated when the demanded torque is above the torque threshold.

- [c15] 15. The method of claim 13, further comprising allocating at least some of the torque to the motor when the amount of charge of the electrical storage device is above the predetermined value.
- [c16] 16. The method of claim 15, further comprising allocating a majority of torque values to the motor when the demanded torque changes rapidly, thereby maintaining a substantially constant engine torque allocation.